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ABSTRACT

Much of what has developed in the testing of reading harkens back to the days of the "Cult of Efficiency" movement in education that can be largely attributed to Frederick Winslow Taylor. Taylor spent most of his productive years studying time and motion in an attempt to streamline industrial production so that people could work as quickly and efficiently as possible. Education embraced most of Taylor's principles in the early 1900s, and journal articles of the period have documented the extensive influence of this "Cult of Efficiency" on the thinking of educational leaders. It is more than coincidental that standardized tests in subject areas first appeared around 1910, when Taylor and his educational followers were most vocal. The essay test was also replaced with objective tests that took little time to complete and less time to grade. Speed and factual recall, rather than critical comprehension, continue to represent the two most widely tested aspects of reading, although research has confirmed that speed is not an ample measure of reading ability. The question that must concern today's educators is whether the back to basics/competency testing movement is a return to that philosophy of efficiency. (HTH)

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Taylor-made Education

The Influence of the Efficiency Movement on the Testing of Reading Skills

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> The reading class consists of 35.5 fifth grade students, ages 8.5 to 10.5. They spend four minutes reading "A Practical Guide to Getting a Job" orally, in unison. The teacher rapidly and distinctly reads ten vocabulary words, giving one synonym for each. Having been thus prepared for the daily selection, the children excitedly await their favorite activity. At the signal, they open their texts to page 291 and encourage their eyes and minds to hurdle through the 3.2 page selection. As usual, Percival Noteworthy's hand flies into the air first and he gets his 47th gold star on the "Captain Zippo Speed Reading" chart. Laggards are given ninety seconds to complete the selection, during which time the teacher has passed out a ten-question true/false test. Children are given three minutes to complete the exam.

This is what could have happened. This was the idealized wave of the early nineteen hundreds. Educational leaders of the day envisioned a time when the business of schooling became so efficient that exactly the right number of students would be in each classroom; when each teacher would possess the same qualities and skills (those deemed most effective); when children would be pushed through school as quickly as possible (to lessen the per-pupil cost of education); and when the most important criterion of assessment would be speed, both for the student and the grader. Thank goodness it didn't happen. Did it?

Education is in the throes of the Back to Basics/Competency Testing movement, and no where are proponents more adamant than in the area of reading. While none would argue the importance of the ability to read, there is continued healthy debate over which reading skills are most essential and how these skills can best be measured. It is the contention of this writer that much of what has developed in the testing of reading is harkening back to the days of the "Cult of Efficiency," to a time when speed and surface comprehension were the most highly valued components of the successful reader because they could be measured most easily.

The efficiency movement in education in the second decade of this century can be largely attributable to the introduction of scientific management in industry (Callahan, 1962). The man most responsible for making a science of work, the "messiah of time and motion" (Kaw, 1979), was Frederick Winslow Taylor (1856-1915). He spent most of his productive years studying time and motion, in an attempt to streamline industrial production so that people could work as quickly and efficiently as possible, with no wasted motions (Kaw, 1979). The principles of his theory gained widespread acceptance in business, and disciples quickly formed in areas such as local government, religion and education (Callahan, 1962).

Taylor preached six stages of implementing scientific management: (1) a time and motion study and the development of unit times for various components of the job; (2) analysis and improvement of the tools and machines; (3) standardization after the best and fastest methods

have been developed; (4) assignment of tasks according to specific skills; (5) a reward and punishment system; (6) functional foremanship (strong administration) both for training of workers and control of process.

Education embraced many of these principles, although not perhaps the one that could have been most beneficial. In a speech in October, 1913 (Callahan, 1962), Taylor quoted John Dewey in remarking that the main inequality between business and education was funding for experimentation. Without the initial study of what methods, materials, reinforcers and theories were most effective in teaching children, there was no hope that the "Cult of Efficiency" could have a long range positive effect on education. But that didn't stop anyone.

The thrust of the movement in education was criticism. The years of 1911 through 1913 were ones of broad denouncement, not only of public schools but of all institutions. Critics cried for results that could be seen and measured, and proposed the cutting of funds where institutions either didn't measure their products or the products didn't measure up. As Callahan (1962) states in the preface to his book Education and the Cult of Efficiency, "I am now convinced that very much of what has happened in American education since 1900 can be explained on the basis of the extreme vulnerability of our schoolmen to public criticism and pressure and that this vulnerability is built into our pattern of local support and control." He points out that it was at this time that school boards became dominated by businessmen, where they had previously been controlled by politicians.

Criticism of the educational system was evident in general publications such as newspaper editorials, books, and magazines, especially in the rampant muckraking journalism of the day. But perhaps the most intense attention was given within educational circles, in journals and endless organizational meetings. In a 1905 annual meeting of the National Education Association, education came off a distant second in a "Comparison of Modern Business Methods with Education Methods" (Callahan, 1962). Articles such as "Methods for Measuring Teacher's Efficiency" (Boyce, 1915) and "Objective Standards as a Means of Controlling Instruction and Economizing Time" (Courtis, 1915) appeared monthly in most educational journals. J. C. Bell asked in an editorial entitled "Efficiency in the Teaching of English" (Bell, 1915) whether the time spent in teaching English was worth the returns. He proposed that rather than studying grammar and reading orally, children should be trained in "rapid and comprehending silent reading." His laudable suggestion that children should read more books during school time was supported by his contention that the time to do this should be taken "by the elimination of the waste in spelling, which recent studies have shown to be considerable." One writer (Wilson, 1915) proposed a startling solution to the cost of education. In Minimum Essentials in Elementary School Subjects, Wilson suggests shortening the schooling process by two whole years. One begins to see similarities with the current emphasis on "minimum" competencies.

Wilson's suggestion does not seem so dramatic in light of other discussions going on about the country during these years. In an annual

report of the Superintendent of School in New Orleans (Notes and News, 1915), David Hill points out that "there are numerous tables and charts showing the number of over-aged children by schools, the progress of pupils in schools, and suggestions for the practical use of the data suggested." Some of the suggestions over the years included increasing the number of pupils per classroom to save on space, never retaining a child (extra years increased the per-pupil cost of education), increasing secondary teachers' class loads so fewer could be hired, and examing in minute detail every expenditure, from paper towels to desks.

The concern over efficiency was most fervent at the administrative level; these people were, in the last analysis, ultimately accountable. A note in the Journal of Educational Psychology ("Notes and News", 1915) gives insight into the pervasiveness of the "Cult of Efficiency" by this time:

> The department of Superintendence and other sections of the NEA and affiliated societies will meet at Cincinnati, February 22-27...[to discuss] the results of plans to measure efficiency in teaching, how shall the efficiency of teachers be tested and recorded, and the investigation of the efficiency of schools and school systems. At the meeting of the National Council the final report of the committee on tests and standards of efficiency will be presented. The National Society for the Study of Education will consider economy of time in the various school subjects.

Franklin Bobbitt, an instructor in educational administration at the

University of Chicago, was very direct in his charge to administrators concerning their responsibility. He believed, like Taylor, that efficiency depends on "centralization of authority and definite direction by the supervisor of all processes performed...so that there can never be any misunderstanding as to what is expected of a teacher in the way of results or in the matter of method" (Callahan, 1962). If these expectations of teachers seem rigid, one can imagine what would then be expected of students. W.C. Bagley, in Classroom Management, instructed teachers that "unquestioned obedience" was the "first rule of efficient service" (Bagley, 1910). It is only fair to ask if this is an extreme reaction to Taylor's "functional foremanship" model of the strong supervisor. However, Taylor embraces such an educational philosophy in his belief that "...only by requiring workers to submit to the authority of those laws, and thereby to surrender all claims to autonomy or discretion in their work, could the full potential of the industrial revolution be realized" (Kaw, 1979).

It is well documented through journal articles of the period what an extensive effect the "Cult of Efficiency" had on the thinking of educational leaders. It is harder to document what lasting effects may have crept into related areas of education such as testing. However, it is more than coincidence can account for to note that the birth of standardized tests in subject areas occurred around 1910, when Taylor and his educational followers were most vocal. In fact, some early educational testing probably gave impetus to the barrage of criticism previously mentioned. Joseph M. Rice, a physician-turned-educator administered tests in arithmetic and spelling to thousands of children

between 1895 and 1913. Although critics have pointed out that he lacked even a basic knowledge of statistics and that he could not supply the data to support his published results, his findings that the children had performed poorly were widely accepted and discussed (Callahan, 1962). Leaders in the field of measurement such as E. L. Thorndike and his students began developing instruments for measuring achievement in many skill subjects, and by 1910, several of these tests had been standardized.

A concurrent area of testing, and one closely related to standardization, was the objective test, which came to the forefront and has really never left either the classroom or the professional testing field. One of the raging debates of the day was between those who defended the old essay tests and proponents of the new objective test. Impetus was given to the latter group by studies done by Daniel Starch and E. C. Elliott "proving" that essay tests were poor measuring instruments because of grader variability. However, a current expert in tests and measurement (Ebel, 1972) points out that Starch and Elliott "...did not answer the main charge against objective tests [that they could not measure some important factors] and they did nothing to support the belief of some test specialists that anything an essay test can do an objective test can do better." Ebel discusses the debate that was at its heights in 1912, the same year Taylor enjoyed his widest public response (Kaw, 1979). Those who were trying to counter the wave of efficiency in testing (Ebel, 1972) argued that

> Objective tests were characterized as fragmentary and superficial, suitable perhaps for testing memory of factual details but wholly

inadequate for measuring the higher mental processes of logical reasoning, critical evaluation, or creative synthesis. Only an essay test, said the opponents, can adequately test a student's development of these more complex and far more important educational outcomes.

This was not, however, a prevailing opinion. The essay test died quickly and was enthusiastically replaced with multiple choice, fill-in-the-blank, and true/false tests that took little time to complete and less time to grade. Ellwood P. Cubberly, Dean of the School of Education at Stanford and crusader for the efficiency movement, was a prominent name in the field of educational testing. In the "Editor's Introduction" to Modern Methods in Written Examinations (Lang, 1930), Cubberly states the widely-held doctrine of efficiency in testing: "A good class test is one by means of which the pupils may be tested widely, scored objectively, and ranked relatively and with the possibility of but a small degree of error... these would have... the advantages of... wide range of testing, rapidity of scoring, and objectivity."

Mehrens and Lehrman (1969) point out that "Historically, there is much similarity in the development of standardized tests, whether they be individual intelligence tests, aptitude or achievement tests, because they all receive their major impetus from a source other than the concern of the individual pupil per se." This viewpoint was not totaliy without its defendants at the time; John Dewey (a frequent critic of Taylor) tried to persuade educators that tests should be used for diagnostic purposes, to provide a better understanding of children, and not as a "convenient

means of classifying and standardizing students" (Dewey, 1922). Another defendant of the written exam, Horace Mann, had spoken much earlier. He was Secretary of the Massachusetts State Board of Education when the first written exams were given in the Boston public schools in 1845. Mann praised the written exam for precisely the same reason later proponents of the objective exam would promote their tool: teacher accountability. He believed that "if pupils answer questions of book facts readily and accurately but fail in those questions involving relations and applications of principles, then the blame should be placed upon the teacher" (Caldwell & Courtis, 1923). It is interesting that he recognized that the minimal competency of fact retention was not a sufficient measure of a meaningful education.

Surprisingly, given the important position reading has always held in education, the first standardized reading test did not appear until 1915, several years after tests in spelling, handwriting and arithmetic. The most logical explanation of this fact is expressed in American Reading Instruction (Smith, 1934). Nila B. Smith explains that reading was such a complicated, many-faceted skill, that test makers were forced to construct instruments that assessed speed and comprehension because they were "...highly important and at the same time testable features of the reading process." That first reading test was written and researched by Daniel Starch, mentioned earlier as a leader in establishing the objective test as the primary assessment technique. In the introduction to the report on his test and its standardization, Starch (1915) reiterates his strong support of objective testing as a tool for "...examining various

aspects of efficiency of instruction and administration of school systems."

This first instrument deserves close scrutiny; it will be shown that the philsoophy behind it dominated reading testing for many years. In his rationale for skills tested, Starch (1915) states that "...the chief elements in reading are (1) the comprehension of the material read, (2) the speed of reading, and (3) the correctness of pronunciation." He discounted the third factor as "relatively insignificant." He does not define comprehension; however, according to his scoring procedure, it is anything a child remembers from the passage. Thus a literal transfer of words--a test of specific short term memory--is measured, where interpretation, analysis and other aspects of critical thinking are not. These two skills, speed and factual recall, reflect the emphasis on efficiency and measurable products; they also represent the two most widely tested aspects of reading through 1930, when the testing movement first received critical appraisal (Thorndike & Hagen, 1969).

In order to fully understand the effects of this emphasis, it is helpful to look at the instructions to teachers (Starch, 1915):

> Explain to the pupils that they are to read silently as rapidly as they can and at the same time to grasp as much as they can, and that they will be asked to write down, not necessarily in the same words, as much as they will remember of what they read. They should be told not to read anything over again, but to read on continuously as rapidly as is consistent with grasping what they read.

Starch goes on to instruct teachers to allow exactly 30 seconds

for the reading of each of eight graded passages. Children are to make a mark after the last word read, then to write on the back everything that they can remember. Teachers are told to count "...the number of words written which correctly reproduce the thought." They are to cross out any incorrect or added ideas. One can only assume that if a child makes an inferrence, it would lower his or her score!

To his credit, Starch anticipated some reservations about many of the obvious weak points in his test. In a section entitled "Critical Points Concerning the Reliability of the tests" he addressed several of these reservations. He defended the arbitrary 30-second time limit by pointing out that "...the necessary test for this interval could be printed on a sheet of paper about the size of an ordinary page of a reader." (Starch, 1915) One must question whether this was out of a concern for student familiarity, or a desire for a uniform format. He also was concerned that a longer interval of time would make it more difficult to score the results. Starch was fair in noting that first grade students would be at a disadvantage because of less-developed writing skills. He decided that this wasn't really a problem, however, since the first grade would not be compared with other grades. He went on in the article to compare all grades.

Starch was well-armed in his defense against those who might attack his strange assessment of comprehension. He had conducted a study with nineteen pupils to test the question-answer format over blanket written recall. These eighth graders answered ten questions on passages seven and eight, in the allotted time which was "...the period required for the quickest

pupil to finish." (Starch, 1915) He found that the question-answer method was "...less accurate as well as more difficult to score." This is a very unusual statement from the champion of the objective test. Apparently, by this time, he had decided that merely counting words was even more efficient than any of the objective techniques. His conclusion was that counting words was adopted because it was "... simple, rapid and objective." He did concede that it might be better to count "ideas" but that they were too hard to determine.

In reporting the results of wide testing for standardization. Starch (1915) presents some interesting graphs. The graph on reading rate has a pronounced positive skew, indicating a few students who fell well above the mean. The graph for comprehension is quite flat, indicating a very wide range and a large standard deviation. However, when the two scores are combined, the result is almost a normal curve. How many children were held up to this standard, established by combining very fast readers who may not have comprehended and those readers with good verbatim memories? How many future tests were compared to this initial standard?

Even a cursory look at the reading tests used in the fifteen to twenty years following the Starch test confirms the suspicion that his underlying philosophy was extremely influential. The Buros Mental Measurements Yearbooks provide endless examples, both in text descriptions and expert reviews; for by 1938, when the first yearbook was published, most educators were seriously questioning the rate/basic recall philosophy. George Spache (Buros, 1949), in reviewing the Gates Basic Reading Tests (1926-1943 revision), points out that the test is normed for only speed

and accuracy, although it is intended to measure different types of reading skills. Frederick Davis's review of the Iowa Silent Reading Tests (1927-1943) states that these tests "...do not pretend to measure the most subtle aspects of comprehension..." and that their use "... must tend to reward unduly the rapid, superficial reader who is in the habit of skimming along and parroting a phrase or two of the writer." (Buros, 1949) One recognizes the star of the Starch test! William Turnbull further comments on the Iowa tests that "...it is probable that the factor of reading rate enters all sections of the tests." (Buros, 1949)

The folly of tying everything to reading rate was recognized by reading experts who reviewed the tests, if not by the "experts" who wrote the tests. Albert Harris (Buros, 1949) complains that "...a single score is obtained, which depends partly upon comprehension and partly on rate..." in the Purdue Reading Test (1928). In the unsigned review of the Buffalo Reading Test for Speed and Comprehension (1933), the reviewer bemoans the test as a reflection of the whole structure of education where "...the student who stores away the most facts is the most highly educated." (Buros, 1949) Frederick Davis discounts the composite score of the Traxler Silent Reading Test (1932) because of the heavy weighting of the rate score (Buros, 1938). The assistant director of the research division of the National Education Association, Ivan Booker criticized that many reading tests yield "...a score in which rate and comprehension are inseparably tangled." (Buros, 1949) When the widely praised Cooperative Reading Comprehension Test was published

in 1941, it was heralded not only because of its broad interpretation of comprehension skills, but because speed was a separate score, not affecting the other areas (Buros, 1949).

It has been an accepted assumption up to this point that speed is not an ample measure of reading ability. Research both past and present seems to confirm this assumption. The first research study of note on comprehension, and one still quoted and respected, was conducted by Edward L. Thorndike in 1917. After observing that many students could not reason, or make inferences about material they read, Thorndike developed a three-part theory of comprehension. He believed that people who read with good comprehension produced a correct meaning for each word, weighed each word in relation to other words, and "examined and validated" their suppositions about what was read and adjusted them when necessary (Thorndike, 1917). It is obvious that the processes of weighing and examining cannot be done during forced rapid reading, but require time for thinking and possibly rereading material. This idea is supported by some research by McConkie, Rayner and Meyer (Gibson & Levin, 1975) which found that children's rates were fastest when they were looking for specific, objective answers and slowest when they had been asked higher order questions. In her extensive indictment of comprehension instruction in the American school, Delores Durkin (1978-79) substantiates the undesirable effects on an emphasis on speed. She feels that it promotes guessing, retention of trivia and completion rather than understanding of assigned readings.

The question that must concern today's educators is whether we are

returning to the philosophy of efficiency. Are minimal competency exams in reading concerned with anything other than who can get the facts and how fast they can get them? Are tests composed that are easy to take and simple to grade, but not indicative of important educational objectives such as critical thinking? Will testing so that districts can receive funding, or recognition, or "A" marks from the school boards take precidence over testing to improve individual gains in knowledge? If the answers to these questions are "yes," then the state of American education may not be very different from the mental state of those most adversely affected by the "Cult of Efficiency." Those whose first concern is children may find themselves lamenting with a critic of Frederick Taylor, A. J. Portenar (Raw, 1979): "It depresses me horribly. The whole thing looms up vaguely before me as an inhuman inexorable machine, gliding smoothly on its way, but crushing not only all in its way, but sapping the vitality of all connected with it."

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